**Weekly Progress Report**

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Domain: **Data Science and Machine Learning**

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**Week Ending: 01**

**I. Overview:**

This week, the primary focus was on understanding the **Forecasting Smart City Traffic Patterns** project, exploring the provided datasets, and performing initial data analysis using Python. Additionally, efforts were made to enhance skills in data preprocessing and visualization to prepare for upcoming modeling tasks.

**II. Achievements:**

**1. Project Familiarization:**

* Explored project documentation and requirements.
* Understood the goal: forecasting traffic patterns at four city junctions to help government traffic planning.

**2. Dataset Exploration:**

* Loaded two CSV files (file1.csv and file2.csv) into Python.
* Converted DateTime columns to datetime objects for analysis.
* Inspected data types, sample rows, and checked for missing values.

**3. Initial Data Analysis & Feature Engineering:**

* Visualized traffic volume trends by junction over time.
* Added time-based features: day of week, month, hour, for deeper analysis.

**III. Challenges:**

**1. Understanding Dataset Differences:**

* Clarifying the purpose of each file and how they relate.
* Deciding which file to use for forecasting.

**2. Handling Missing or Inconsistent Data:**

* Some DateTime entries missing or irregular.
* Need to clean or interpolate data in later weeks.

**IV. Learning Resources:**

**1. Python Libraries:**

* Practiced using pandas, matplotlib, seaborn for data loading and visualization.

**2. External Learning:**

* Followed online tutorials and documentation to better understand time series analysis and feature engineering.

**V. Next Week's Goals:**

**1. Deeper Data Analysis:**

* Perform advanced exploratory data analysis.
* Identify holiday effects and special days impacting traffic.

**2. Modeling Preparation:**

* Research suitable time series models (ARIMA, Prophet, LSTM).
* Prepare dataset for model training (train/test split, normalization).

**VI. Additional Comments:**

Successfully completed initial setup and data understanding. Excited to explore forecasting models in coming weeks and contribute to creating actionable insights for smart city traffic management.